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SOURCE

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- A. The present Soviet iron and steel balance
- B. Iron and steel requirements for the vehicle industry
- C. Iron and steel requirements for the construction of machines, apparatus and boilers
- D. Iron and steel requirements for armament production
- E. Iron and steel requirements for other metal-working industries
- F. Iron and steel requirements for the building industry
- G. Iron and steel requirements for the maintenance of mining and public utility installations and the maintenance of industry and traffic installations.

This report is mainly a study on the iron and steel consumption in the Soviet Union. Most of it is based on rough estimates as no definite information was available. Part A is a compilation, part B through G contain individual data.

These investigations will be continued and supplemented in the future giving the individual production branches and foundries. The remaining areas of the Eastern Bloc will also be covered.

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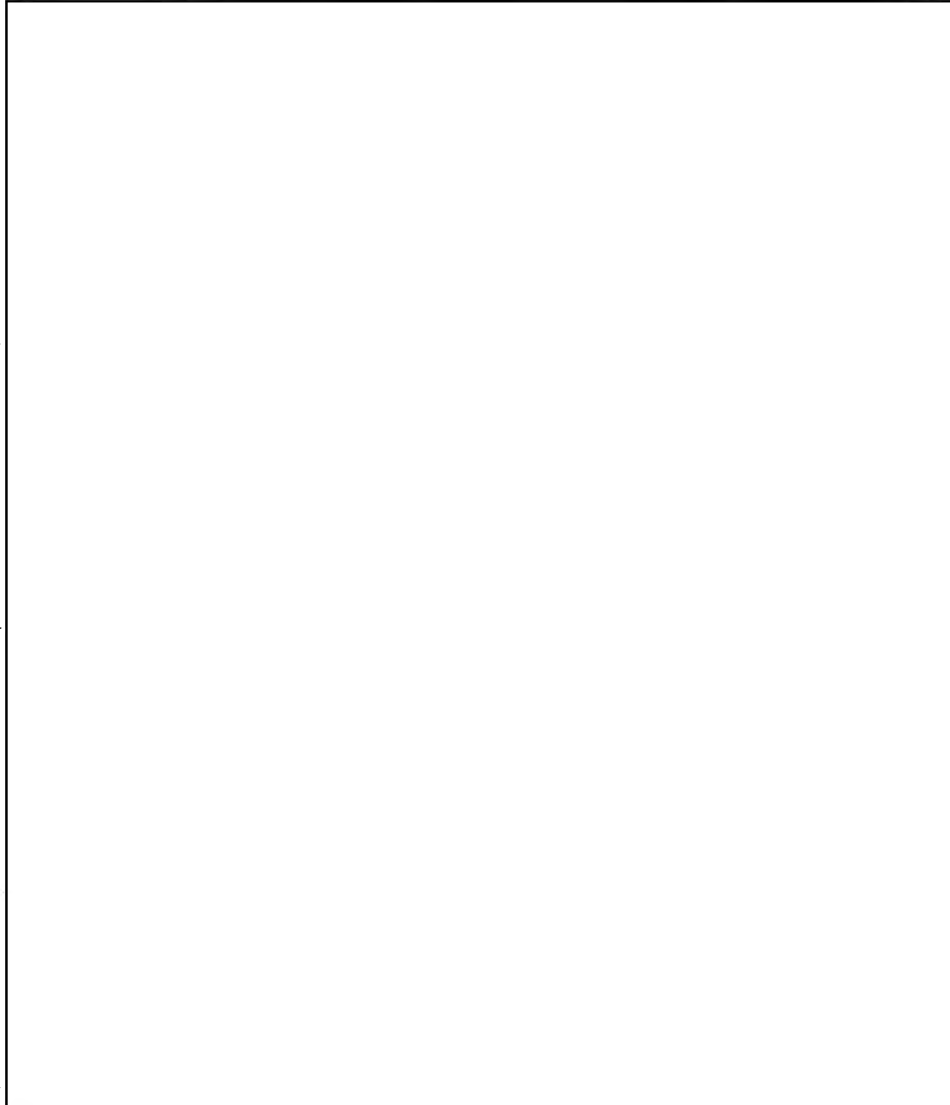
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A

The Present Soviet Iron and Steel Balance

1. The iron and steel balance (production, consumption and stock piles) consists of the available stocks of usable and workable iron and steel materials on one side, and of the requirements for the maintenance of plant installations and fulfilment of investment and production programs on the other.

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- a. Usable and workable iron and steel materials are only such materials already manufactured into final products by the iron-working industries and used or treated as such without further treatment in the iron and steel producing industries. These materials therefore are semi-finished products, rolled products, pressings and forgings, bright materials and castings.
2. Such materials can be divided into two large groups of rolled materials comprised of all above-mentioned items except castings, and castings
 - a. On the credit side are mostly the current new production and the storage of supplies in these two groups, on the debit side the consumption of materials by the use or further treatment in the various branches of the iron-working industries, as well as the necessity for further stock piles.
 - b. Almost no figures are available on the storage of supplies or their stockpiling. They can only be computed from the balance. Therefore, such indications at first will have to be left out of consideration.
3. Individual data on the use and processing of iron and steel (iron and steel consumption as well as iron and steel requirements) are indicated in the sections that follow:
 - a. The following three large groups must be distinguished:
 - (1) Finished iron (iron and steel materials used as primary materials for intermediate and final products of the individual production schedules of the iron-working industries including accessories, spare parts as well as the development and stockpiling of such products.)
 - (2) Iron for investment purposes (iron and steel materials needed for the construction of projected new industrial public utility, housing and traffic installations)
 - (3) Iron for maintenance purposes (iron and steel materials needed for the maintenance of existing installations, especially for replacements and repairs in the production and traffic industries).
 - b. A specified list of the estimated consumption and requirements is shown in the annex.
4. The 1948 rolling production was computed at 16.7 million tons. The corresponding 1950 planning figure is 17.8 million tons.

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The annual production of castings was estimated at about 3 million tons. However, this figure can be increased at discretion by higher scrap additions (broken castings).

b. In computing the foundry pig iron amounts it was assumed that for the raw steel output a 90 percent share of pig iron would be needed for Thomas steel, a 70 percent share for open-hearth steel and a 45 percent share for electric steel. However, the open-hearth steel production can be stretched to the extreme limit of 50 percent scrap addition, and the electric steel production even up to 90 percent scrap additions. If a higher percentage of scrapings for the steel production is assumed (i.e. 40 percent for open-hearth steel production and 65 percent for electric steel production) the 1948 foundry pig iron share would increase to 3.5 million tons and the 1950 share to 3.7 million tons.

(1) With substantial scrap additions the production of castings could easily be increased to 5 million tons.

c. The 1948 iron and steel requirements therefore could be covered from the current production without difficulty although they fall considerably short of the 1950 scheduled requirements.

(1) The consumption of the rolling production (rolled materials, forging and shaped pieces) is shown in the following list of large consumers in quantitative sequence: (in million tons)

	1948	1950
Iron and steel construction (B, E)	3.13	4.36
Armament production (D)	2.42	3.62
Construction of machines, apparatus and boilers (C)	2.4	3.04
Building industry (F)	2.0	2.4
Motor vehicle industry (B, 3, E)	1.69	2.49
Iron, steel and sheet metal products (E1, a, 3, 4)	1.31	1.37
Requirements for maintenance (G)	1.34	2.08
Shipbuilding industry (E5)	0.39	0.52
Electrotechnical, precision mechanical, optical and metal wares	0.18	0.21
	14.86	20.09

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(a) This would mean a production surplus of about 1.8 million tons of rolled materials for 1948 which may have been used mainly for stock-piling. No exaggerated planning targets for 1948 are known nor are there any indications of iron and steel shortages in the attainment of previous production targets. However, it is questionable whether difficulties may have arisen in the procurement of special kinds such as hard acid proof and other alloy steels, high-grade structural steels, high-speed steels, medium and light sheets and deep-drawn or plated materials. Such complications can be assumed for at least part of the armament, vehicle, and machine production programs.

(b) However, the 1950 scheduled/rolled production is about 2.3 million tons below the scheduled requirements of the processing industries, the iron-consuming industrial branches as well as traffic and building industries. The requirements of rolled products would exceed the output only by about 1.2 million tons if the tank production is actually not higher than in 1948 (see note page 43...)

(c) It may be concluded from these figures that the production rate of individual manufacturing industries will be more intensified for technical reasons than that of the iron-producing industries while relying on substantial iron and steel stock piles to fill the temporary gaps, or that the planning targets, especially of the iron-working industries, were intentionally exaggerated to vigorously spur production of these industries.

(d) The latter possibility is likely, at least for iron and steel construction, for the construction of machines, apparatus and boilers and for the motor vehicle industry. The 1950 production schedule of these industries indicates an increase of 40 percent or more against the 1948 production figures which can hardly be reached in two years even if the planned expansion of technical installations was considered. Especially high are the scheduled production figures of locomotives and railroad cars, trucks, tractors and machine tools. Only these productions will be affected by the considerable bottleneck of the mentioned special steel sorts. Also, the practical capacity of the tank industry can hardly be fully utilized if the planning targets of the mentioned industries will have to be reached. Considering the Soviet Army stocks of tanks and self-propelled guns it can be assumed that this quota of rolled products is allocated to those industrial branches which were necessarily neglected in wartime.

(e) However, there is no doubt that the realization of the 1950 program of the iron-working industries will by no means be impaired by a shortage of iron and steel materials. Even if no new supplies were stored during the current year, substantial stop-gap reserves may be available, as considerable amounts could have been stockpiled during the past year.

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(f) It is also possible to favor the mentioned production branches by cutting allocations to the building and consumer goods industries. It can even be expected with certainty that production quotas in these industries will be reduced when shortages of materials arise because the social program always ranks behind all other requirements.

(2) The consumption of castings is shown in the following list: (in million tons)

	<u>1948</u>	<u>1950</u>
Motor vehicle industry	0.93	1.44
Construction of machines, apparatus, and boilers	0.95	1.28
Armament production	0.78	1.09
Iron and steel construction	0.52	0.82
Iron, plate, and metal wares	0.13	0.13
Shipbuilding	0.1	0.13
Electrotechnical products	<u>0.02</u>	<u>0.03</u>
	3.43	4.92

(a) No deficit will occur in the production of castings if the mentioned possibilities of increasing the originally estimated production figure are considered.

(b) As there are no specified data on the production and capacity of the individual grey iron, malleable iron and steel foundries, it is not known whether the necessary amounts of thin-walled special castings, and especially high-grade castings, will be available, particularly for the construction of machines and engines.

B

Iron and Steel Requirements for Vehicle Production

The following requirements for the different branches of the vehicle industry can be calculated from the estimated Soviet production and from key figures of iron and steel needs:

1. Locomotive and railroad car construction:

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Estimated production figures	1945	1950
Steam locomotives	1,500	2,200
Diesel and electric locomotives	500	520
Coaches	1,500	2,600
Freight cars	60,000	95,000

Types taken into account	Required amount of iron and steel* t	Percent		
		Rolled materials	Forgings and pressings	Castings
Express train locomotives) 134 tons, 127 tons and 82 tons	218			
Passenger train locomotives) 133 tons, 92 tons and 85 tons		74	14	12
Diesel locomotives 72 tons) and 45 tons)	86			
Electric locomotives 47 tons) and 34 tons)				
Express train railroad cars 43 tons, coaches 25 tons	69			
Boxcars** 28 tons, tank cars) 24 tons)		67	10	23
Armored cars 20 tons, covered) cars 22 tons)	30,5			
Platform cars 18 tons)				

* Including spare parts, accessories, repair materials and maintenance materials

** The designation "tons" for railroad cars indicates the iron weight which is 60 to 80 percent of the total weight.

These figures show following iron and steel requirements (in 1,000 tons):

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a. For locomotives	<u>1948</u>	<u>1950</u>
Rolled materials	323	493
Forgings and pressings	61	92
Castings	<u>52</u>	<u>80</u>
	436	665
b. For railroad cars	<u>1948</u>	<u>1950</u>
Rolled materials	1,297	2,057
Forgings and pressings	194	308
Castings	<u>443</u>	<u>715</u>
	1,934	3,080

- c. According to the planning figures the following rolled materials are needed for superstructures:

1948: 1.2 million tons 1950: 1.35 million tons

2. Tractor construction:

Estimated production figures: 60,000 units for 1948

112,000 units for 1950

Types taken into account	Weight of finished product	Required amount of iron and steel (in tons) *	Percentage figures		
			Rolled materials	Forgings and pressings	Castings
			for engines		
S 80 caterpillar Diesel	6.5)	average	24	11	65
64 HP caterpillar Diesel	5.7)				
ATS-Nati caterpillar generator	4.6)				
STS-Nati caterpillar 0 to-engine	4.2)				
CHTS caterpillar Diesel	4.3)				
	4.4 t				
			for frames and bodies		
		8.7			

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Types taken into account	Weight of finished product	Required amount of iron and steel (in tons)*	Percentage figures		
			Rolled materials	Forgings and pressings	Castings
K 12 caterpillar generator	4.5)		54	5	41
KD 35 caterpillar diesel	3.6)				
STS caterpillar Otto-engine	3.2)				
Universal wheel Otto-engine	2.2)				
12 hi wheel Otto-engine	1.6)				

* Including spare parts, reserve engines, accessories and repair materials.

Total iron and steel requirements (in 1,000 tons):

	1948	1950
Rolled materials	227	421
Forgings and pressings	36	67
Castings	259	484
	522	975

3. Output of motor vehicles

Estimated production figures:	1948	1950
Trucks	300,000	423,000
Passenger cars	50,000	65,000
Buses	4,000	5,400
	354,000	500,000

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a. The following estimates were made by using comparative figures of other countries with important motor vehicle production and by considering purpose and normal composition of the motor vehicle stock:

	<u>1948</u>	<u>1950</u>
Truck trailers	66,000	100,000
Bus trailers	2,600	4,000
Motorcycles	50,000	65,000

Types taken into account	Weight of finished product	Required amount of iron and steel (in tons)*	Percentage figures		
			Rolled materials	Forgings and pressings	Castings
7-ton Diesel truck	7.7	5.5	45	8	47
5-ton Diesel truck	7.1				
4-ton truck	5				
3½-ton truck	3.8				
3½-ton Diesel truck	4				
3-ton truck with wood gas producer	2.5	2.5	64	15	26
2½-ton truck	2				
1½-ton truck	1.3				
140HP Hoalter	1.8				
50 HP 5-seater car					
23 HP passenger midget car	0.9	0.25			
250 cubic centimeter motorcycle	0.17				
200 cubic centimeter motorcycle	0.15				
125 cubic centimeter motorcycle	0.1				
8-ton trailer	3.5	2.5			
5-ton trailer	2.8				
3-ton trailer	1.9				
Bus	4.2				
Bus-trailer	2.9				

for frames, bodies, super-structures and trailers

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* Including reserve engines, spare parts and accessories, repair materials and maintenance materials.

b. According to these estimates the motor vehicle industry has the following total iron and steel requirements (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Trucks	1,650	2,354
Passenger cars	129	163
Busses	39	59
Motorcycles	13	16
Car trailers	164	250
Bus trailers	9	13
	<u>2,004</u>	<u>2,855</u>

Specification of requirements (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Rolled materials	1,122	1,589
Forgings and pressings	221	314
Castings	<u>661</u>	<u>952</u>
	2,004	2,855

4. The iron and steel needs for the vehicle production (locomotive and railroad car construction, material for railroad superstructures, tractors and motor vehicles) are therefore:

6,096 million tons in 1948

8,925 million tons in 1950.

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C

Iron and Steel Requirements for the Construction
of Machines, Apparatus and Boilers.

1. The engineering industry, in its widest sense, is one of the most important iron and steel consumers. However, reliable estimates are available only for a few production branches. Other calculations had to be based on rough estimates.

a. The planning figures of the 1946 to 1950 Five Year Plan and the 1947 production schedule as well as the continued output of former serial products indicate these particulars on the following production branches:

	Unit of measure	1948	1950
Machine tools	1,000 units	33	36.3
Stationary engines for ironworks and rolling mills	1,000 tons	65	103
over 100 kws or 135 HP	1,000 units	8	9
below 100 kws or 135 HP	1,000 units	550	624
Steam turbines	1,000 HP	3,200	3,950
Water turbines	1,000 kws	850	1,022
Pneumatic machines and pumps	1,000 tons	108	174
Agricultural machines	1,000 tons	31.7	536
of which tractor plows	1,000 units	72	110
cultivators	1,000 units	58.5	82.3
sawing machines	1,000 units	62	83.3
combined threshing machines	1,000 units	12	18.3
Textile machines			
Spindles	1,000 units	1,100	1,400
Looms	1,000 units	20	25

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2. The following production figures are estimated for the remaining machine construction branches:

a. Woodworking machines.

The 1950 schedule provides for a total production of 74,000 metalworking and woodworking machines, tools and precision instruments. About 25,000 units of this total may be woodworking machines. This approximates the German production figures for 1928 and 1938. About 22,000 woodworking machines may have been produced in 1948.

b. Foundry machines and installations.

The production ratio of ironworks and rolling mill installations to foundry machines is about 6:1 in all highly industrialized countries. Therefore, about 11,000 tons can be assumed for 1948 and about 17,000 tons for 1950. (The German output was 10,000 tons in 1938 and 20,000 tons in 1948.)

c. Piston engines.

The Soviet prewar production of piston engines was about three-quarters of the German output, which reached about 10,000 tons in 1936. This output was considerably increased in the first postwar Five Year Plan and can be estimated at least at 9,000 for 1948 and 10,000 tons for 1950.

d. Dressing and building machines.

No details are available. It is only known that before the war this machine construction branch had developed to a higher degree in the Soviet Union than in Germany. The German 1928 production was 228,000 tons, the 1938 production 283,000 tons. The estimated 1948 Soviet production was 250,000 tons and may be 300,000 tons in 1950.

e. Machines and installations for the food and luxury and the chemical industries.

The Soviet prewar production of the food and luxury industry was about 50 percent higher than the German production while the output of the Soviet chemical industry was about two-thirds of the German production value. Since no further information is available it can only be assumed that the Soviet 1948 output of food and luxury, and chemical machines probably equaled the German 1928 output (about 100,000 tons) while a production increase of at least 20 percent may be expected for 1950 (120,000 tons).

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f. Mining machines and installations, conveying machinery and lifting appliances.

(1) The 1928 German production was 242,000 tons, 213,000 tons in 1938 and 126,000 tons in 1944. The scheduled 1948 production of Bizonia listed contingent weight of 250,000 tons. The significance of this production was based on the exclusive first priority of the mining industry and on the necessity of extensive repairs, replacements and modernization of conveying installations.

(2) The present Soviet mining output can be estimated at 280 million tons in 1948 and 340 million tons in 1950. According to German comparative figures the 1948 steel requirements for this industrial branch in the Soviet Union can be assumed at 230,000 tons, and the 1950 production at 270,000 tons.

g. Railroad safety appliances, fire extinguishing instruments etc.

The railroad net alone does not offer sufficient information on signalling and safety equipment, because in the Soviet Union the number of tracks, the intervals between block stations, and safety devices do correspond to those of the dense German railroad system. The best basis for an estimate is the operation and traffic performance. The ratio in relation to the German performance was about 1.3 : 1 in prewar times. Considering the German 1938 production of 55,000 tons the Soviet output can be estimated at 71,000 tons in 1948 and to approximate 80,000 tons in 1950.

h. Antifriction bearings, gears, gear wheels and driving gears.

No indications are available. Even such an important item as antifriction bearings is mentioned at no place in the plans. Extraordinary efforts are known to have been made since 1946 to intensify this production, which was insufficient even before the war. However, it is doubtful whether the German prewar output, second only to the USA, has been reached. The German maximum output in 1928 was 131,000 tons while from 1939 to the end of the war the annual production was steadily maintained at between 90,000 to 100,000 tons. The Soviet 1948 estimated production was about 80,000 tons, and about 100,000 tons may be produced in 1950.

i. Industrial furnaces.

The output of special furnaces, especially of electric and other metallurgical furnaces (as far as these furnaces are not recorded as ironworks installations) is relatively insignificant compared to the other construction branches. From 1928 to 1944 the German production ranged between 13,000 and 21,000 tons. A maximum Soviet output of 15,000 and 20,000 tons can be assumed for 1948 and 1950.

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j. Construction of boilers and apparatus

No records are available. The German production was 186,000 tons in 1936. A contingent weight of 124,000 tons was provided for the 1948 production of Bizonia (this allocation also considered reconstruction work, increased repairs and necessary replacements of antiquated installations). The Soviet requirements, under similar circumstances at least 1 1/2 to twice the present needs of Bizonia, can be estimated at 200,000 tons for 1948 and at 240,000 tons for 1950.

k. Fittings.

The German production of fittings reached 115,000 tons in 1938 and 113,000 tons in 1944. The Soviet production may be at least one-third or one-half more than these figures. Estimated 1948 production: 160,000 tons. Estimated 1950 production: 190,000 tons.

l. Other engineering construction.

It especially comprises office machines, automatic machines, scales, safes, rolls and roller engraving machines, testing machines, transmissions and other items. In Germany this production takes about 5 percent.

Weight of engineering construction, in the USA almost 10 percent. The total Soviet output may roughly be estimated at 75,000 to 100,000 tons.

3. The weight of the needed iron and steel amounts (weight of rolled materials and castings) is about 1.6 times the weight of the finished product in all engineering construction branches. The average distribution is about 65 percent for rolled materials, 7 percent for forgings and shaped pieces, and 28 percent for castings. The individual branches were computed according to special key figures.

a. The following list of the total iron and steel requirements (in 1,000 tons) and the corresponding key figures is based on these production estimates:

	<u>1948</u>	<u>1950</u>
Metalworking machines and tools	20 301	332
Woodworking machines	20 48	54
Ironworks and rolling mill installations	94	149
Foundry installations	16	25
Stationary engines	85	96

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	<u>1948</u>	<u>1950</u>
Piston engines	14	16
Steam turbines	48	58
Water turbines	37	46
Pneumatic machines and pumps	166	268
Dressing and building machines	395	474
Mining machines, conveying installations and lifting appliances	310	365
Agricultural machines	469	792
Machines and installations for the food and luxury and the chemical industry	130	156
Machines for the textile, leather and paper industry	375	442
Railroad safety installations, fire-extinguishing instruments etc.	64	72
Antifriction bearings, gears, gear wheels, driving gears	196	245
Construction of apparatus, boilers, central heating and ventilating systems	290	348
Fittings	202	239
Other engineering construction	102	136
	<u>3,342</u>	<u>4,313</u>

b. The following rolled materials, forgings and shaped pieces as well as castings are needed for this total production (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Rolled materials	2,170	2,735
Forgings and shaped pieces	226	303
Castings	946	1,275
	<u>3,342</u>	<u>4,313</u>

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German iron and steel requirements for engineering construction (by way of comparison):

	1936: 3.76 million tons
	1938: 4.29 million tons
	1940: 4.08 million tons
	1944: 2.69 million tons
in Bi-	
zonias	1948: 1.03 million tons

D

Iron and Steel Requirements of the Armament Industry

1. The iron and steel consumption of the armament industry of the Western Allies and Germany averaged one-third of the total steel consumption in the last years of the war. The corresponding Soviet average is estimated at almost 60 percent for this period. The demand of the armament industry is a very important factor even today. However, extraordinarily few records are available on the present volume of the Soviet armament production. The subsequent calculations of the postwar production could be based on reliable estimates only as to air-planes and tanks; otherwise rough comparative figures, representing wartime estimates of the 1943 Soviet production, had to be used. Although the 1944 production was higher in many fields it is preferable to refer to the 1943 production figures as the production of ammunition, consuming especially large amounts of iron and steel, and the production of guns and small arms had declined in 1944.

a. Airplanes:

Four-engine bombers	150
Twin-engine bombers and reconnaissance planes	3,115
Single-engine low-attack and ground attack planes	7,970
Single-engine fighter planes	10,420
Transport planes	630
Trainers	3,600
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	25,885

(about 42,000 in 1944)

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b. Armored vehicles:

Armored reconnaissance cars	4,300
MC carriers, armored prime movers	8,000
Light, medium and heavy tanks and self-propelled guns	34,000
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	46,300

c. Guns:

Light AA guns	16,500
heavy AA guns	6,000
AT guns	10,500
Light field guns	13,000
Heavy field guns	1,400
Medium artillery	350
	<hr/>
	47,750

d. Mortars and rocket launchers 30,000

e. Automatic weapons and small arms:

Machine guns	85,000
Submachine guns	120,000
Rifles and carbines	1,800,000
Revolvers and pistols	500,000

f. Ammunition:

Bombs and other ammunition dropped from aircraft	120,000 tons
Light AA ammunition	95 million rounds
heavy AA ammunition	7 million rounds
AT ammunition	10 million rounds
Field artillery ammunition	35 million rounds
Medium artillery ammunition	2 million rounds
total gun ammunition	149 million rounds
Mortar ammunition	90 million rounds
Infantry ammunition	3,800 million rounds

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2. a. Estimated airplane output:

	<u>1948</u>	<u>1950</u>
Four-engine bombers	480	540
Twin-engine bombers, reconnaissance and transport planes	4,800	6,500
Single-engine ground attack planes	3,600	5,400
Turbine and jet planes	4,800	8,400
Other fighter planes	9,600	12,000
Trainers	4,800	6,600
	<u>28,080</u>	<u>39,440</u>

b. The following rough estimates of the tank production are available:

Medium and heavy tanks and self-propelled guns

<u>1948</u>	<u>1950</u>
26,500	43,200*

* (If almost complete utilization of capacity is assumed according to various reports received after this study was completed it can be assumed that the 1950 tank output will hardly exceed the 1948 volume.)

As to armored reconnaissance cars, MG carriers, armored prime movers, personnel carriers and light tanks, much lower production figures must be assumed for 1950 than for 1948. A cautious estimate would show the following:

	<u>1948</u>	<u>1950</u>
Armored reconnaissance cars	1,000	1,600
MG-carriers and armored prime movers	2,000	3,000
Personnel carriers and light tanks	1,500	2,000

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c. The remaining armament program can only be conjectured. It is merely known that the production of attack weapons predominates, such as airplanes, tanks, self-propelled guns, mortars, mine throwers, and fully automatic small arms which have virtually replaced the ordinary rifle.

(1) The output of light and heavy AA guns may be limited to the minimum required for the defense of the western areas. The output of AT guns has also doubtlessly declined considerably because of the superior military position of the Soviets in Europe. There may be an adequate production of field guns. However, according to the last wartime experience medium artillery will retain a certain significance only as fortress artillery.

(a) Altogether it can hardly be expected that gun production will rise more than about 25 percent above wartime figures. The following production figures are estimated:

	<u>1948</u>	<u>1950</u>
Light AA guns	4,000	4,000
Heavy AA guns	1,200	1,400
AT guns	2,000	2,000
Light field guns	2,500	2,500
Heavy field guns	300	300
Medium artillery	50	60
	<u>10,050</u>	<u>10,260</u>

(2) However, the mortar production will probably maintain at least its wartime volume and may approximate following figures:

	<u>1948</u>	<u>1950</u>
Mortars and mine throwers	25,000	30,000

(3) The wartime production of automatic weapons was considered insufficient. Considerable wartime gaps in the equipment with machine guns and submachine guns were bridged by lend-lease deliveries. A substantial increase of production can therefore be expected. The production of rifles, carbines and pistols will probably, at best, reach a proportionate amount as required for the equipment of the respective new age-class (estimate: One age-class numbers almost two million men. They are equipped with three-quarters of the existing armament, one quarter has to be manufactured).

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This calculation would lead to the following production figures:

	<u>1948</u>	<u>1950</u>
Machine guns	100,000	120,000
Submachine guns	250,000	300,000
Rifles and carbines	200,000	200,000
Revolvers and pistols	300,000	300,000

(4) The output of ammunition, comprising almost half of the wartime armament steel consumption, may have declined considerably. It must be considered that, since the end of the war, supplies are already stockpiled for four years and that political tendencies doubtlessly discourage any military ventures before the end of the current Five Year Plan.

(a) The following maximum production can therefore be estimated for securing a more than sufficient ammunition stockpile within the first postwar Five Year Plan:

	<u>1948</u>	<u>1950</u>
Bombs and other ammunition dropped from aircraft	40,000 tons 4 mil rounds	45,000 tons 4 mil rounds
Light ammunition	↓	↓
Heavy AA ammunition	0.3 million rounds	0.3 million rounds
AT ammunition	0.5 million rounds	0.5 million rounds
Field artillery ammunition	2.5 million rounds	2.5 million rounds
Medium artillery ammunition	0.07 million rounds	0.08 million rounds
Mortar ammunition	1.9 million rounds	2.1 million rounds
Infantry ammunition	400 million rounds	450 million rounds

(b) The former and present output of mines, hand grenades, Bazookas etc. is not known. Estimated figures must be used for any calculation of steel consumption.

(5) The same applies to the production of V-weapons which in 1948 was probably below the figures indicated in par 3 f. This production requires only a small amount of steel.

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(6) (a) Hardly any indications are available on the building project of the naval yards except that at least one, at best three, medium aircraft carriers and some heavy battle ship or battle cruiser units, in addition to some torpedo boats and a great number of submarines, outpost patrol boats and mine sweepers, were said to have been laid on keel or have been launched. However, it must be considered that the building projects were presumably subject to certain changes in the course of the negotiations on the delivery of the Soviet share of the Italian fleet.

(b) Only the submarine construction figure of about 50 boats annually can be indicated as a concrete estimate.

(c) The total output of the naval shipyards is probably not much higher than in wartime despite considerable efforts and may have an annual maximum production rate of 150,000 to 200,000 gross register tons of finished warships.

3. The iron and steel requirements for the mentioned production figures were calculated from the following key figures of the finished steel weight (structural weight of the iron and steel share) or the following average amounts of needed iron and steel:

a. Airplanes

(All models of the current production are considered).

	Finished steel weight (in tons)	Needed amount* of iron and steel (in tons)	Percentage	
			Rolling material	Castings
Four-engine bombers	4.8-5.9	11)	
Twin-engine bombers	2.6-3.4)	
Twin-engine transport planes	3.0-4.9	6)	
Twin-engine fighter planes, long-range fighter planes and reconnaissance planes	5.0-2.4)	
Single-engine ground attack planes	1.1-2.2	3.2)	57 43

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	Finished steel weight (in tons)	Needed amount* of iron and steel (in tons)	Percentage	
			Rolling material	Castings
Single engine fighter planes	1.0-1.3	2.4		
Jet planes	1.6-2.4	4		
Single-engine reconnaissance planes	0.9-1.1	2		
trainers	0.4-0.6	1		

The needed amounts of iron and steel refer only to the new production (including aircraft armament); excluded are amounts needed for stockpiling, development, accessories, spare parts etc. A 60 percent increase of the total iron needs is required due to the heavy wear on engines (reserve engines) and the necessary extensive storage of supplies.

b. Armored vehicles

(All models of the current production are considered)

	Finished steel weight (in tons)	Needed amount* of iron and steel (in tons)	Percentage **		
			Rolling material	Castings Forgings and pressings	
Armored reconnaissance cars	4.9	12			
MG carriers and armored prime movers	5.8	15			
Personnel carriers (armored)	10.4	25			
Light tanks	12				
Medium tanks	30-33		67	13	20
Heavy tanks	47	80			
Medium self-propelled guns	33-35				
Heavy self-propelled guns	52				

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* Including stock-piles, accessories, spare parts and armament

** Including engines

c. Guns

	Finished steel weight (in tons)	Needed amount* of iron and steel (in tons)	Percentage	
			Rolling material	Castings
Light AA guns	0.8-4.2	7)		
Heavy AA guns	9.7-15.5	32.5)		
AT guns	3-5.1	11.2)		
Light field guns	1.9-3.8	8.4)		
Heavy field guns	4.5-12	21.2)	90	10
Medium artillery	18-50	81.2)		
Mortars and mine throwers	80-1.0 kg))		
Heavy mortars	0.5-0.8)	2.2)		
Multiple rocket launchers))		

* Including stockpiles, development, spare parts, accessories etc.

d. Automatic weapons and small arms

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	Finished steel weight (in kilograms)	Needed amount* of iron and steel (in kilograms)	Percentage	
			Rolling material	Castings
Light machine guns	8.2)		
Heavy machine guns	19.5-24	30)	
Sub machine guns	1.9-3.5	7.2	92	8
Rifles and carbines	2.8-3.3	6)	
Revolvers and pistols	0.4-0.7	1.4)	

e. Ammunition

(1)

	Finished steel weight (in kilo- grams)	Needed amount* of iron and steel (in kilo- grams)	Percentage	
			Rolling material	Castings
Bombs and other ammunition dropped from aircraft	x	x 1.9		
Light AA ammunition	1.2-3.1	4)	
Heavy AA ammunition	14.2-36	50)	
AT & munition	2.5	5)	
Field artillery ammunition	13-42	50	25	75
Medium artillery ammunition	60-140	200)	
Mortar ammunition	3-10.5	12)	
Infantry ammunition 20-30 grams		60 grams	100	

(2) The production and steel consumption of submarine mines, land mines, hand grenades, bazookas etc. can be estimated at one-fifth to one-quarter of the remaining ammunition output. Thirty-three percent of this consumption consists of rolled materials and 67 percent of castings.

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f. V-weapons

No records are available. The maximum production of V-weapons may be estimated at 40 to 45 units per workday with an average consumption of 4.2 to 4.3 tons of raw materials for each unit (80 percent rolled materials and 20 percent castings).

g. Warship building

The iron and steel consumption is 1.95 tons per gross registered ton including armament and superstructures (82 percent rolled materials and 18 percent castings).

4. The above computation of iron and steel amounts needed for armament production is summarized in the following chart:

	1948		1950	
	Rolled materials	Castings	Rolled materials	Castings
Air armament production	85	64	120	90
Tank production	1,760	444	2,856	714
Gun and mortar production	160	17	177	19
Rocket weapons	40	10	48	12
Other weapons	6	-	7	-
Gun and mortar ammunition	68	203	69	206
Mines, hand grenades etc.	70	-	70	-
Infantry ammunition	24	-	29	-
Warship construction	207	46	240	52
	2,420	784	3,616	1,093
	3,204		4,709	

E.

Iron and Steel Requirements of the Remaining Iron-working Industries

The iron, steel and sheet-metal wage industry is the most important consumer of the manufacturing industries next to the armament, machine, and vehicle production.

As there is hardly a single indication available on this Soviet production branch an estimate must be based on the following consideration and calculations:

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1. A large part of this production consists of agricultural small appliances and manual instruments as well as other agricultural items and horseshoeing.
- a. The contingent allocated in Bizonia for this production is about 80,000 tons of rolled materials (including bright materials, forgings and pressings) and about 3,000 tons of castings for a total cultivated area of about 2.25 million hectares.
- b. In estimating the corresponding Soviet iron and steel requirements a relative deduction approximating 50 percent would be expedient considering the greater mechanization of Soviet agriculture and the resultant lesser use of manual instruments as well as the much inferior equipment of the Sovkhoz and Kolkhoz farms and of the farming labor.
- c. Thus the Soviet iron requirements for agricultural items could be 4,800 tons of rolled materials and 180 tons of castings per million hectares of cultivated area.
- d. The total Soviet cultivated area was about 123 million hectares in 1948 and allegedly will be increased to about 129 million hectares in 1950. The following iron and steel requirements for agricultural items may therefore be estimated: (in 1,000 tons)

	<u>1948</u>	<u>1950</u>
Rolled materials	590	620
Castings	<u>22</u>	<u>23</u>
	612	643

2. Ranges and stoves are another important production branch of the iron, steel, and sheet-metal ware industry. About 3 million units were produced in Germany in 1936, and about 1.4 million units in Bizonia in 1948. The corresponding iron and steel consumption was 241,000 tons and 112,000 tons which consisted of 72 percent materials and 28 percent castings each. This would mean an average of about 40 stoves and ranges per 1,000 inhabitants. The density of inhabited housing space in the Soviet Union is almost twice that of Germany. Therefore the Soviet production may not be much higher than an average of 20 units per 1,000 inhabitants despite the Five Year Plan targets demanding an improvement of housing facilities and an increase in settlement construction. With a population of about 190 million in 1948 and about 193 million in 1950 this would mean a production figure of 3.8 million and 3.9 million units respectively.

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a. The corresponding iron and steel consumption would be (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Rolled materials	219	225
Castings	<u>85</u>	<u>87</u>
	304	312

3. Next in this production line are the proper household and kitchen utensils including tinwares, small apparatuses, household machines, transport barrels and containers, household tins, boilers etc. Although this production is well balanced in Bizonia an annual contingent of 235,000 tons is provided for the Bizonian industry, representing about 5 1/2 kg per inhabitant. The corresponding Soviet figure may be at least one, at best three, kg per inhabitant which would mean an iron consumption for these iron wares totaling 380,000 tons in 1948 and 390,000 tons in 1950. There are no possibilities for greater accuracy of calculation as the Five Year Plan has only very general indications.
4. The remaining production branches of the iron, steel and sheet-metal ware industry are much less important than those last mentioned. They are mostly pressed, drawn, and punched parts, springs, chains, screws, wires and nails, small tools, small wares, cutting wares, locks and fittings, office, writing and drawing implements, sport instruments, music instruments and toys. As no detailed indications are available (except the production of 1 million gramophones) only comparative German production figures can be used in this case also. The German 1936 production was 255,000 tons, the Bizonian 1948 production 40,000 tons. It is only known that the corresponding Soviet prewar production was not even half of the German production. The iron requirements for this production may therefore be estimated at a maximum of 70,000 to 10,000 tons for 1948 and 1950.
- a. The share of castings in the two last production branches reaches only a few percentages and need not be considered.
5. The second (sic; of group E) largest consumer is the shipbuilding industry.
- a. The postwar Five Year Plan calls for an increase of the sea-going and inland waterway shipping to 3.6 million gross register tons by 1950 which would be 2 1/2 times the 1940 figure. In 1940 the tonnage of ships over 100 gross register tons was 1.32 million gross register tons in addition to a tonnage of 0.25 million gross register tons of ships below 100 gross register tons. The prewar capacity of the Soviet shipyards was about 250,000 gross register tons compared to the German capacity of 393,000 gross register tons in the last prewar year.

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b. The total postwar tonnage of the Soviet sea-going and inland waterway fleet can be estimated at about 1.8 million gross register tons considering about 30 percent shipping losses and including the Soviet gain in captured vessels and reparation deliveries. The necessary constructions demanded in the Five Year Plan, therefore, will about reach 0.3 million gross register tons during the first years and progressively increase to 0.4 million tons during the last years.

c. The iron and steel consumption for ship, ship boiler and ship engine construction is 1.63 tons per gross register ton. This would mean the following iron and steel requirements for the mentioned shipbuilding projects:

1948: 489,000 tons

1950: 651,000 tons

d. The share of rolled materials and castings is extremely variable according to the size and type of the ship and therefore can hardly be estimated.

e. According to comparative German production figures at least about 30 percent rolled materials and, at best, 20 percent castings can be assumed.

6. Another substantial amount of iron and steel is consumed for the production of field railroad materials needed by industrial plants.

a. No detailed information is available on this production. It is merely stated in the Five-Year Plan that the production of plant locomotives and field railroad equipment has to be particularly intensified.

b. The German comparative figures can again serve for computing the Soviet production figures. The German prewar iron and steel consumption for the production of field railroad materials for industries and plants amounted to 62,000 tons.

c. Since these kinds of field railroad equipment are required principally for the mining and building industries the best estimate could be based on a comparison of the German and Soviet labor figures of these industries.

(1) The German prewar labor numbered about 0.8 million in the mining industry, and about 2.7 million in the building industry.

(2) The corresponding Soviet figures can be estimated for 1950 at 1.3 million and 4.2 million and for 1948 at 1.2 million and 4 million. This would mean that equivalent Soviet equipment would require iron and steel for the production of field railroad materials in amounts exceeding the German prewar figures almost 50 percent for 1948 and almost 60 percent for 1950.

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d. However, it cannot be assumed that the Soviet field railroad equipment of mining and building industries, as well as of industrial plants, would even approach the relative volume of the German prewar equipment. A cautious estimate would have to deduct at least 20 percent to 25 percent. Thus about 115 percent of the German prewar figures must be assumed for the Soviet 1948 production (125 percent for 1950). The following iron and steel consumption would be computed according to these estimates (75 percent rolled materials and 25 percent castings) (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Rolled materials	54	59
Castings	<u>18</u>	<u>19</u>
	72	78

7. The production of bicycles is another important iron and steel consuming industry. The Soviet output was 130,000 bicycles in 1932 and 540,000 bicycles in 1937. Although no production figures are mentioned in the Five-Year Plan the mass production of improved and cheap bicycles is demanded.

a. The Soviet monthly output was allegedly 120,000 to 150,000 bicycles during the war. This is a possible figure as the Bizonian monthly production figure passed the 100,000 mark. A bicycle production of about 2 million units can be assumed for 1948, and 2.4 million units for 1950.

b. Twenty-seven kg of iron and steel are needed for the production of each bicycle in addition to about 12 kg for accessories and spare parts to be manufactured for former production series.

c. Thus, the iron and steel consumption for the bicycle industry would run to the following figures

1948: 78,000 tons
1950: 94,000 tons

Ninety-three percent of this amount would be rolled materials and only 7 percent castings.

8. The remaining production branches of the iron-working industries (electro-technical, fine mechanical and optical products, metal wares) are insignificant in iron and steel consumption. Light and nonferrous metals are mostly used while steel is of very little importance.

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a. The electrical industry claims the largest portion of the remaining iron and steel amounts. No specified estimate can be made as there are no concrete indications available on this diversified and variable production.

(1) The Five Year Plan refers only to production figures of water and steam turbines (listed under engineering construction). Otherwise it only indicates in general terms an increased production of electrical instruments, measuring instruments, electrical equipment, radio sets, refrigerators etc. and calls for the production especially of new types of electric motors and machines, transformers, high frequency installations, rectifiers, telephone and telegraph installations etc.

(2) The only clue is an indication demanding the production of electrical equipment to increase two and a half times over the prewar figures.

(3) The prewar total production value of the Soviet electrical industry was 3.89 billion rubles, the corresponding German production value was 2.15 billion Reichsmarks.

(4) Thus the prewar total value of the Soviet electro-technical production amounted to barely half of the German prewar production value (the effective domestic purchasing power of the ruble being considered, not its parity to the mark).

(5) The 1938 iron and steel consumption of the German electric industry totaled 241,000 tons. The corresponding contingents for the Bizonian electro-technical industry were 93,000 tons in the last year.

(6) It must be noted that due to the Soviet power system the Soviet electric industry had to produce and probably will have to continue to produce much less high tension installations than was required by the German electric industry. However, the production of high tension installations alone absorbs a substantial amount of iron (electric machines, generators, transformers, rectifiers, rotary engines, cables and armatures).

(7) Considering this fact it would be erroneous to estimate the Soviet 1950 iron and steel requirements for the electric industry at 125 percent of the German prewar figure according to the general quota figure of the Five-Year Plan. An approximate estimate at best would be about double the amount of the present iron contingent of the Bizonian electric industry.

(8) The Soviet electro-technical iron and steel consumption is therefore estimated at 160,000 tons for 1948 and at 180,000 tons for 1950.

b. The iron and steel consumption for fine mechanical and optical products is completely insignificant. The German

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prewar consumption was 33,000 tons. The Bizonian consumption was 19,000 tons in the last year.

(1) It is extremely difficult to compare the Soviet output of fine mechanical and optical products with the German prewar output as concrete figures are not available. The Five-Year Plan only demands an essentially expanded production of some items, such as microscopes, movie pictures, movie projectors, cameras, binoculars and watches.

(2) However, the Soviet output of fine mechanical and optical products probably would by no means exceed the volume and importance of the corresponding German prewar industry, once leading in Europe. Since only very slight amounts have to be considered, the approximate iron and steel requirements can be estimated at 20,000 tons for 1948 and at 25,000 tons for 1950.

c. Similar figures can be assumed for the production of metal wares. The German prewar iron consumption of the metal-ware industry was 46,000 tons. The corresponding Bizonian postwar consumption is barely 10,000 tons.

(1) The corresponding Soviet figure may be estimated at best at 20,000 tons for 1948 and 1950.

(2) No specification according to rolled materials and castings is needed as the share of castings is small and of no importance.

F

Iron and Steel Requirements of the Building Industry

1. It is especially difficult to compute the iron and steel requirements for investment purposes (structural iron) because indications required for detailed and specific calculations are not available and large-scale estimates imply considerable deficiencies. Also any comparison with German figures is possible only to a limited degree.

a. The German 1937 iron and steel consumption for the entire building industry was 2.1 million tons. The Bizonian 1948 iron and steel contingents for building purposes totaled 0.48 million tons, 30,000 tons of this being allocated for industrial building projects, 350,000 tons for public and private building projects, and 50,000 tons for road-making and underground constructions.

2. The 1936 and 1937 Soviet labor force employed in the building industry was approximately 2.4 million and was about the same in Germany. The Soviet 1948 labor force can be estimated at about 4 million while the Bizonian labor force reached almost 1 million.

a. If the ratio of the labor force and the structural

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iron needs were similar in the Soviet Union and in Germany the Soviet 1948 iron requirements for the building industry would range between 166 percent of the German 1936 structural iron consumption and 400 percent of the Bizonian 1948 structural iron contingents i.e. between 3.4 million and 1.8 million tons. This wide span indicates the extraordinary inconsistency of the structural iron needs in the building industry. If ^{is used} the labor figure, prewar Germany consumed almost twice as much structural iron as postwar Germany. This fact not only indicates the present iron shortage but also the possibilities of saving iron by resorting to makeshift construction, ironsaving building structures and substitutes of steel structures by using new building methods and devices.

b. The limited use of structural iron in the building industry is much more conspicuous in the Soviet Union. Structural iron has long been of much less importance in the Soviet Union than in Germany. Timber instead of iron is mostly used for housing and settlement constructions in the Soviet Union. The percentage iron share of the Soviet building industry therefore may, at best, reach the present Bizonian percentage.

3. It seems to be more expedient to compare the proportionate figures of the building material consumption in the Soviet Union and in Germany.

a. The 1936/1937 Soviet consumption of basic building materials (cement, lime, bricks) was only 66 percent of the German consumption. Other building materials (gypsum, tiles, roofing felt) amounted to only 59 percent. Glass was about 210 percent and building timber 285 percent of the German consumption. These comparisons show the different Soviet building method and technique.

b. The ratio of the German and Soviet building materials consumption with regards to its value would be 1 : 1.49 without timber and 1 : 0.63, timber included. As comparatively much more timber than structural iron is consumed, only the first ratio can be used as reference. By reducing the Soviet prewar consumption to 66 percent of the German consumption (1.4 million tons) it would result in a basic figure which is more adequate for being increased up to 166 percent (F, 2). This would approximate 2.25 million tons. This figure comes closer to the mentioned minimum limit of 1.8 million tons.

c. If the Soviet estimated 1948 building material output, presumably corresponding to the building material consumption, is compared to the Bizonian figures it would result in a ratio of 1 : 0.26, timber excluded. If the same ratio is applied to structural iron the Soviet iron and steel requirements for the building industry would be about 2 million tons in 1948.

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d. The Five-Year Plan offers another possibility of calculating the building requirements for the period of 1946 to 1950. It lists the following individual data on new construction or reconstruction projects:

Indication of the Five-Year Plan:	Iron and steel consumption according to German experience:	
	Average amount of required iron and steel, indicated in tons per project	Variation of needed amounts, indicated in tons per project
5,900 production plants	100 tons	20-800 tons
18,700 movie theaters	50 tons	
390 theaters and museums	200 tons	
104,900 club houses and libraries	5 tons	
750 hospitals, recreation centers and sanatoriums	50 tons	
4.2 million sqm. of finished buildings	2 tons (average housing space 50 sqm)	
12 million sqm. of homes and settlements	1.5 (normal building 40 sqm of built-up area)	
72.4 million sqm. of municipal housing space	1 ton on 30 sqm	
3.4 million sqm. of housing in rural areas	1 ton SU/0.25 ton	
180 bridges	1,000 tons	100-30,000 tons
1,625 railroad stations, freight, locomotive, and railroad car sheds, repairshops and workshops	150 tons	very great variations
Water systems in 16 towns) Sewage systems in 13 towns)	cannot be indicated*	

* Fittings already considered in the para "Engineering construction" take the largest steel consumption share.

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4. Similar results are shown by a comparison of the capital investment for the building industry with the gross production values of the building industry. This comparison would approximate the following estimate for the 1946 to 1950 building projects stated in the Five-Year Plan: (in 1,000 tons)

Industrial buildings	590
Public building projects	1,127
Housing construction	3,881
Bridge construction	1,900
Railroad construction (surface constructions)	2.4
Road-making and underground construction	about 750

Total: 8,492

a. Steel needs for improvement and repair work of existing buildings have to be added, comprising about 40 percent of the requirements of new surface constructions. Considering the share required by the formerly occupied or devastated areas these additional Soviet steel needs may be estimated at 20 to 25 percent. Thus about 1.42 million tons have to be added to the mentioned amount which would make about 10 million tons.

b. According to the relative percentage figures for 1948 and 1949 the structural iron requirements would amount to 2 million and 2.4 million tons. These figures confirm the mentioned estimates.

5. In summing up these individual calculations the iron and steel consumption for the building industry (investment iron) can be estimated at 2 million tons for 1948 and 2.4 million tons for 1950. These materials consist exclusively of rolled products, bright materials, forgings and pressings.

G

Iron and Steel Requirements for Maintenance of Mining and Public Utility Installations and the Maintenance of Industry and Traffic Installations

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1. Mining and public utility installations

a. The production and maintenance requirements (up-keep and replacements) for mining and public utility installations are based on the following estimates:

Mining		Requirements for (1*)		Additional require- (2*)	
Estimated Soviet out- put in million tons		maintenance and replacements in tons per 1,000 ton output		ments of wires and hoisting cables in kg per 1,000 ton output	
1948	1950				
Hardcoal					
159	198	1.6		84-117	
Coke (3*)	20	30			
Brown coal	41	52	Underground mining) 0.5-1.9) Surface mining) 0.24-0.35)	5-6	
Briquettes (3*)	5.8	7.4			
Potassium salts	4.5	5.1	0.4 - 1.0	118-164	
Mineral salts	1.2	1.4	0.4- 0.6	45-65	
Iron ores	35.0	40	1.0-1.2	143-170	
Manganese ores	3.2	3.6			
Chrome ores	0.12	0.15			
Copper ores (content) (4*)	0.16	0.19			
Lead ores (content)	0.12	0.18	1.3-1.5		
Zinc ores (content)	0.15	0.2		154-168	
Other ores	0.3	0.35			
Bauxite	0.54	0.80			
Magnesite	0.8	1.0	0.9-1.4		
Fluorspar and heavy sp. graphite etc.	0.5	0.6			

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Estimated Soviet output in million tons	Requirements for (1*)		Additional requirements of wires and existing cables in kg. per 1,000 ton output
	1948	1950	
Cruze oil	32.5	35.4	0.35-0.6
Public utility installations production			
Power (in billion kws)	58	82	1.3 (in billion kws)
Gas (in billion cubic meters)	8.5	11.2	1.5 (in billion cubic meters)
Water			(15 percent to 20 percent of the amounts required for power plants and gas works)

(1*) Requirements for maintenance and replacements. These rough estimates do not permit any specification, especially of rolled materials, forgings and pressings. The share of castings is negligible.

(2*) Important special product

(3*) Briquette and coke production (briquette plants, coking plants) have already been considered in the hard coal figure.

(4*) The entire nonferrous mining output is estimated from the ore content (1948: 3.54 million tons
1950: 5.45 million tons)

b. (1) Summarized estimate of iron and steel requirements (rolled materials, pressings, forgings and slight amounts of castings) for production and maintenance (in full 1,000 tons):

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	<u>1948</u>	<u>1950</u>
Hard-coal mining	254	317
Brown-coal mining	28	36
Potash mining	3	4
Mineral salt mining	1	1
Iron and manganese ore mining	42	49
Nonferrous-metal mining	5	8
Other mining	1	1
Crude-oil production	16	18
	<u>350</u>	<u>434</u>
Power plants	64	90
Gasworks	13	17
Waterworks	13	19
	<u>90</u>	<u>126</u>

The bulk of these requirements is taken by coal mining, power generation and iron ore mining follow. The remaining items are small and will not change much, even if there were sizable variations in the actual production.

(2) The following cable requirements are assumed on the basis of the estimated output (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Hard coal	15.9	19.8
Brown coal	0.2	0.3
Potash	0.6	0.7
Mineral salt	0.1	0.1
Iron and manganese ores	5.7	6.6
Other ores	0.6	0.9
	<u>23.1</u>	<u>28.4</u>

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Although these items are comparatively small, their share in the Soviet cable production is of considerable importance.

(3) Total estimated steel needs for maintenance and replacements (in 1,000 tons):

	<u>1948</u>	<u>1950</u>
Mining	373	462
Public utilities	90	162
	463	624

2. Iron and steel requirements for the maintenance of industry and traffic installations

a. Aside from mining and public utilities, the maintenance and replacement requirements of the remaining production industries and of the traffic installations (maintenance iron) take a large share in the iron and steel consumption.

(1) This consumption is mainly confined to the maintenance purposes of the following branches:

- Iron-producing and metal industries
- Iron and metalworking industries
- Building industry
- Timber industry
- Stone, earth, ceramic, and glass industries
- Chemical industry
- Traffic installations.

(2) Only negligible amounts of iron and steel are required by all remaining industries. They are needed for finished products already considered in the consumption of the manufacturing industries.

b. The maintenance and replacement requirements of the iron-producing and metal industries is 0.8 percent of the iron and steel output. The Soviet figures therefore are 327,000 tons for 1948 and 359,000 tons for 1950.

c. The maintenance and replacement requirements of the iron and metalworking industries are 3.4 percent of the production. The Soviet figures therefore are 272,000 tons for 1948 and 349,000 tons for 1950.

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d. The requirements of maintenance iron for the building industry are almost 3.3 percent of the production requirements. The corresponding Soviet figures are 66,000 tons for 1948 and 79,000 tons for 1950.

e. The maintenance and replacement requirements of the traffic installations, such as locks, bridges, shipyards, locomotive and railroad car sheds, safety installations, repairshops and workshops are approximately 5 percent of the production requirements. Superstructure materials and rolling stock are not included in the replacement needs as they are considered in the production estimate of the industries. Thus, Soviet maintenance iron requirements for traffic installations come to 36,000 tons for 1948 and 46,000 tons for 1950.

f. The maintenance iron requirements of the Soviet chemical industries can be computed only by relying on German production figures. The Bizonian maintenance and replacement contingents of the chemical industries were 25,000 tons in the past year. Since the output of basic chemical products, such as sulphuric acid, soda, caustic soda, nitrogen compounds, fertilizer, plastics, basic dyes and soap bases, is of main importance the Soviet figures are computed from the ratio of the 1948 Bizonia production to the 1950 Soviet production targets in these products.

(1) The Bizonian 1948 chemical production was 29 percent of the Soviet 1950 production schedule. The maintenance and replacement requirements of the Soviet chemical industry is therefore estimated at 73,000 tons for 1948, 87,000 tons for 1950.

g. The requirements of the stone and earth industries (including quarries) and of the ceramic and glass industries are computed by the same method. The ratio of the Bizonian 1948 production to the Soviet 1950 production schedule of cement, lime, bricks, fireproof stones and glass is 0.31 : 1. As the Bizonian 1948 maintenance and replacement contingents for stones, earths, glass and ceramics was 31,000 tons, the Soviet requirements can be estimated at 86,000 tons for 1948 and about 100,000 tons for 1950.

h. In the wood industry it is expedient to compare the Soviet 1950 planning figures for the lumber and sawn-timber production with the corresponding figures of the Bizonian 1948 output as the sawmills demand the largest amount of maintenance iron. The ratio is 0.14 : 1. The Bizonian 1948 contingent is 3,000 tons. The requirement figures for the Soviet wood industry therefore are 20,000 tons for 1948 and 23,000 tons for 1950. The needed amount of castings is negligible and may not be considered.

i. The total estimated requirements for the maintenance and replacement in mining and public utility installations are 880,000 tons for 1948 and 1,043,000 tons for 1950.

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3. The estimated iron and steel requirements for the production and maintenance of mining and public utility installations and the maintenance of industries and traffic installations are therefore 1,343,000 tons for 1948 and 1,631,000 tons for 1950.

1 Annex: Iron and steel requirements listed according to consumer groups and industries (in million tons).

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Annex (Page 1)

Iron and Steel Requirements
Listed According to Consumer Groups and Industries
(in million tons)

	<u>1948</u>		<u>1950</u>	
	<u>Rolled material Castings</u>		<u>Rolled material Castings</u>	
1. <u>Finishing Industries</u>	0.09	0.06	0.12	0.09
Air armament industry	↓			
Tank industry	1.76	0.44	2.86	0.74
Weapon industry	0.21	0.03	0.23	0.03
Ammunition industry	0.16	0.2	0.17	0.21
Warship building	0.21	0.05	0.24	0.05
Other shipbuilding industry	0.39	0.1	0.52	0.13
Railroad super-structures	1.2	-	1.35	-
Locomotive and railroad car construction	1.88	0.5	2.96	0.8
Field and plant railroad construction	0.05	0.02	0.06	0.02
Motor vehicle industry	1.69	0.93	2.49	1.24
Engineering construction	2.19	0.67	2.79	0.94
Construction of apparatus, boilers, central heating systems, and ventilating systems, construction of fittings	0.21	0.28	0.25	0.34
Agricultural iron products	0.59	0.02	0.62	0.02
Manufacturing of stoves and ranges	0.22	0.09	0.22	0.09

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Annex (Page 2)

1948

1950

Rolled material Castings Rolled material Castings

(cont'd of Page 1)

Bicycle industry	0.07	0.01	0.08	0.01
Other iron, steel, and sheet-metal ware industries	0.45	0.01	0.45	0.01
Metal ware industry	0.02	-	0.02	-
Electrotechnical industry	0.14	0.02	0.15	0.03
Fine mechanical and optical industry	0.02	-	0.02	-

2. Investment requirements

Surface and underground construction and road-making	2.0	-	2.4	-
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3. Maintenance requirements

Mining	0.33	-	0.46	-
Power supply	0.09	-	0.13	-
Iron and metal production	0.33	-	0.36	-
Iron and metal-working industries	0.27	-	0.35	-
Chemical industry	0.07	-	0.09	-
Wood industry	0.02	-	0.02	-
Stone, earth, ceramic, and glass industries	0.09	-	0.1	-
Building industry	0.07	-	0.08	-
Traffic installations	0.04	-	0.5	-
Total (1-3)	14.86	3.43	20.09	4.92

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